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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,884	06/24/2003	Guillermo R. Villalobos	NC 84,352	5995
26384	7590	02/10/2005	EXAMINER	
NAVAL RESEARCH LABORATORY ASSOCIATE COUNSEL (PATENTS) CODE 1008.2 4555 OVERLOOK AVENUE, S.W. WASHINGTON, DC 20375-5320			XU, LING X	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/601,884	VILLALOBOS ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ling X. Xu	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 07 January 2005.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,4,5-21 is/are pending in the application.
- 4a) Of the above claim(s) 6-18 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1, 4-5 and 19-21 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 13 November 2003 is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's affirmation of the election of Group I in the reply filed on 1/7/2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

***Claim***

2. Claims 6-18 are withdrawn from consideration. However, claims 6-18 are missing in the Listing of Claims filed on 1/7/2005, appropriate correction is required.

3. It is suggested that minor changes to be made to claim 1 to recite a product that is essentially devoid of a sintering aid, said product comprising spinel has porosity of less than 0.2%, said product (or spinel) is transparent to light having wavelengths in the range of 0.3-5.5 microns and said product (or spinel) having transparency in excess of 50% for a thickness of 1mm, said spinel has grains within about 300% of the size of an average again and said spinel is devoid of grains larger than about 1mm.

***Claim Rejections - 35 USC § 102/103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 4-5 and 19-21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sellers et al. (US 3,768,990).

With respect to claims 1 and 19-21, Sellers discloses a product comprising a transparent sintered body. The transparent sintered body contains magnesia-alumina spinel having high transparency for a wide range of wavelengths from visible rays to infrared rays including the range of 0.4-7 micron (Col. 4, lines 1-10). The spinel made by Sellers have shown in line transmission in the visible wave length region in excess of 75% for a millimeter thickness of the element (col. 4, lines 1-15), which is within the claimed range as recited.

Sellers also discloses that the magnesia-alumina spinel has extremely small particle size well under one micron (col. 2, lines 60-67). Accordingly, the spinel is devoid of grains larger than about 1mm and is devoid of grains of exaggerated sized including grains size of over 300% of the average grain. The spinel disclosed by Sellers shown in line transmission in the visible wave length region (wavelengths in the range of 0.4-7 micron) in excess of 75% for a millimeter thickness is another strong indication that spinel is devoid of grains larger than about 1mm and is devoid of grains of exaggerated sized since spinel with grains larger than about 1 mm and grains of exaggerated sized would have made the spinel opaque to light.

Sellers further discloses that the sintering aid LiF powder is uniformly mixed in the fine spinel powder (col. 3, lines 1-35), which accelerates the densification of the shaped body and provides the sintered body with uniform properties. During the sintering process, the temperature is raised to from about 1300°C to 1600°C for up to 3 hours, which would cause the LiF sintering aid to vaporize. Accordingly, the final spinel product is considered essentially devoid of a sintering aid component.

With respect to claims 4-5, spinel is well known in the art as a hard crystalline solid, or as defined by the specification of the present application on page 1, a crystalline structure of the type  $AB_2O_4$ . Seller discloses that the spinel is made from a composition containing equal molar amounts of magnesium oxide and aluminum oxide (abstract). Spinel containing equal molar amounts of magnesium oxide and aluminum oxide has the formula of  $MgAl_2O_4$ .

With respect to the claimed spinel having a porosity of less than 0.2% as recited in claims 1 and 19, Sellers discloses that sintering aid LiF added to the spinel is functioned as a densification agent because high densification is important to the attainment of optimum transparency and the other physical characteristics desired (col. 3, lines 20-35). Therefore, the porosity of spinel is considered to be minimum (much less than 0.2%) in the final in Sellers sintered spinel in order to have a transparency of over 75% in the visible wavelength range or in the alternative, it would have been obvious to one of ordinary skill in the art to make the spinel as dense as possible (much less than 0.2% of porosity) in order to obtain an optimum transparency.

#### *Response to Arguments*

5. Applicant's arguments filed 1/7/2005 have been fully considered but they are not persuasive.

Like many other references, Sellers discloses what the product has rather than what the product does not have. Sellers is silent about the spinel product essentially devoid of a sintering aid, is silent about the spinel product devoid of exaggerated size (exaggerated size is defined by applicant to be above 300% of the size of an average grain) and devoid of grains larger than

1mm, and is also silent about the porosity of the spinel product. However, carefully review Sellers' disclosure shows that Sellers' spinel has all the limitations stated above.

With respect to the sintering aid LiF, Steller discloses the use of the same sintering aid of LiF as the present application for the densification of the spinel, the spinel then undergoes a heat treatment at the temperature range of 1300°c-1600°c for up to 3 hours (col. 3, lines 35-50). This temperature range is actually within or slightly higher than the temperature ranged of 1200°c-1550°c employed by the applicant, see page 8 of the Remarks/Argument filed on 1/7/2005. Applicant states at page 8 of the Remarks/Argument that temperature about 1200°c to 1500°c is "too high for the sintering aid to remain in the product." Accordingly, LiF is equally removed in Sellers and thus anticipates the recitation "essentially devoid of a sintering aid...."

With respect to the spinel devoid of exaggerated size, Steller discloses the spinel powder preferably to have sub micron particle sizes (col. 2, lines 14-16). The sintered aid LiF is uniformly applied to the spinel with sub micron size (col. 3, lines 1-5). Although the method to achieve uniformity is different from that used in the present application, Applicants failed to present sufficient evidence that Sellers' method of applying LiF uniformly will result in exaggerated grain sizes and thus poor transparency. As a matter of fact, the method of Sellers resulted same or better transparency as detailed in col. 4, lines 1-10 of Sellers, a further indication that Sellers product is also devoid of exaggerated grain sizes.

With respect to the porosity of the spinel product, as is well known in the art, the lower the porosity, the better the transparency. Sellers used a densification agent LiF to reduce porosity. The fact that Sellers achieved same or better transparency than the product of the present application is a *prima facie* evidence that the "less than 0.2% of porosity" is inherently

disclosed in or obvious over Sellers. Applicants failed to present evidence that Sellers has more than 0.2% porosity.

In summary, Sellers may have disclosed a different method of making the spinel product. However, the final spinel product made by Sellers has the same material, structure and functions as the claimed product.

The following is the detail responses to Applicant's arguments filed on 1/7/2005:

a. Applicant argues that the disclosure pertains to the powder particle size and not to the grain size of the product. Applicant further argues that it does not appear that the Sellers reference discloses any product grain size at all.

Spinel is well known in the art to have a crystalline structure. The definition of the spinel in the present specification further confirms that spinel "is defined as a crystalline structure of the type  $AB_2O_4$ ", see page 1 of the specification. In fact, Applicant has also referred the spinel as "spinel powder particles" throughout the specification, see page 8, lines 1, 15-20 and also in the Examples of the present application. Accordingly, the term "spinel powder particles" is the same as "spinel grain." The term "spinel powder particles size" is the same as "spinel grain size".

b. Applicant also argues that the Examiner makes an unsubstantiated statement that Sellers product is devoid of grains of exaggerated size.

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Steller discloses the spinel powder preferably to have sub micron particle size (col. 2, lines 14-16). The sintered aid LiF is uniformly applied to the spinel with sub micron size. Although the method to achieve uniformity is different from that used in the present application, Applicants failed to present sufficient evidence that Sellers' method will result in exaggerated grain sizes and thus poor transparency. As a matter of fact, the method of Sellers resulted same or better transparency as detailed in col. 4, lines 1-10 of Sellers, a further indication that the spinel in Sellers is devoid of exaggerated grain sizes.

c. Applicant also argues that the LiF sintering aid is not the same "uniform mixing" as disclosed in the present application, as LiF is dissolved to form a sintering aid solution which is used to uniformly coat the powder particles and thus attain a level of uniform mixing not attained by the physical mixing.

The "uniformity mixing" is not required in claims. Arguments are not commensurate in scope with the claims.

d. Applicant also argues that Sellers wants the sintering aid LiF to remain, whereas claim 1 recites that the claimed product is devoid of the sintering aid and the LiF should be removed from the product in order to enhance its transparency. Applicant also refers to Fig. 3 for data to show that the transparency is significantly reduced in the presence of LiF.

Sellers discloses that it is desirable to avoid total loss of the LiF prior to the hot pressing operation in the process. However, at the hot pressing operation, Sellers discloses that the temperature is raised to from about 1300°C to 1600°C for up to 3 hours (col. 3, lines 35-50). This

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temperature is actually within or slightly higher than the temperature ranged of 1200°C-1550°C indicated by the applicant on page 8 of the Remarks/Argument filed on 1/7/2005. Applicant states, on page 8 of the Remarks/Argument, that temperature about 1200°C to 1500°C is “too high for the sintering aid to remain in the product.” Accordingly, LiF is equally removed in Sellers and thus anticipates the recitation “essentially devoid of ....”

Regarding Fig. 3 of the specification, Application argues that the prior art product #1 is shown as having significantly reduced transmission because of the present of the LiF. In fact, the product #1 in Fig. 3 is a very different product from the Sellers’ spinel. Sellers’ spinel has much higher transmission than prior art product #1 and have the same or higher transparency than the products #2 and #3, which are the product claimed in the present application.

e. Applicant also argues that there is no basis for assuming that porosity of Sellers product is 0.2% or less and it is believed to be higher and porosity can be low when the pores are plugged, as with a sintering aid.

As is well known in the art, the lower the porosity, the better the transparency. Sellers used a densification agent LiF to reduce porosity. As discussed above, the LiF has evaporated at the end the process thus no pores are plugged by the sintering aid. Applicants failed to present evidence that Sellers has more than 0.2% porosity. The fact that the spinel in Sellers has the same or better transparency than the product of the present application is a *prima facie* evidence that the “less than 0.2% of porosity” is achieved in Sellers since the porosity of the final spinel is directly related to the transparency, the lower the porosity, the higher the transparency.

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f. Applicant also argues, with respect to the issue of particles V. grains, that Stellers discloses the spinel particles not spinel grains.

As stated above, spinel is well known in the art to have a crystalline structure. The definition of the spinel in the present specification further confirms that spinel “is defined as a crystalline structure of the type  $AB_2O_4$ ”, see page 1 of the specification. In fact, Applicant has also referred the spinel as “spinel powder particles” throughout the specification, see page 8, lines 1, 15-20 and also in the Examples of the present application. Accordingly, the term “spinel powder particles” is the same as “spinel grain.” The term “spinel powder particles size” is the same as “spinel grain size”.

g. Applicant also argues that the starting particle size of the spinel powder is different from the final grain size of the densified shape. The Sellers reference procedure actually leads to large sized grains not sub-micron.

The Examiner acknowledges that final grain size depends on various factors as indicated by the applicants. However, there is no evidence in Sellers or provided by the applicant (other than theory) to show the spinel of Sellers leads to large sized grains.

Steller discloses the spinel powder preferably to have sub micron particle size (col. 2, lines 14-16). The sintered aid LiF is uniformly applied to the spinel with sub micron size. At the end of the process, the LiF evaporated at high temperature as stated above. Although the method to achieve uniformity is different from that used in the present application, Applicants failed to present sufficient evidence that Sellers’ method will result in a different spinel with exaggerated grain sizes and thus poor transparency. As a matter of fact, the method of Sellers resulted same

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or better transparency as detailed in col. 4, lines 1-10 of Sellers, a further indication that the spinel in Seller is devoid of exaggerated grain sizes.

h. Applicant argues that powders in Sellers are mixed with the sintering aid in the traditional sense, but not uniformly on a microscopic scale. Since a “uniform” mixture is not completely homogeneous and creates areas of differential densification that are able to overcome with the invention of the present application.

Again, Steller discloses the spinel powder preferably to have sub micron particle size (col. 2, lines 14-16). The sintered aid LiF is uniformly applied to the spinel with sub micron size. At the end of the process, the LiF will evaporated at high temperature as stated above. Although the method to achieve uniformity is different from that used in the present application, Applicants failed to present sufficient evidence that Sellers’ method will result in a different spinel with exaggerated grain sizes and thus poor transparency. As a matter of fact, the method of Sellers resulted same or better transparency as detailed in col. 4, lines 1-10 of Sellers.

### *Conclusion*

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling X. Xu whose telephone number is 571-272-1546. The examiner can normally be reached on 8:00 - 4:30 Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah D. Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Ling X. Xu  
Examiner  
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